



Cultivating an Ecological Conscience

by Fred Kirschenmann, Ph.D.

This piece is an excerpted version of Dr. Kirshenmann's talk to the 32nd National Pesticide Forum, Advancing Sustainable Communities: People, pollinators and practices, April 12, 2014, held at Portland State University. The complete talk can be found at <http://bit.ly/1E6Tg8X>.

When the conference opened, the conveners said that the conferees would leave with a sense of hopefulness. I took that as a challenge. So, I'm going to talk about why we can and should all be hopeful. When Václav Havel became president of Czechoslovakia, the country was in a mess and everybody knew it. Somebody apparently went to him after he was elected president and said, "So are you optimistic that you can change things and actually make something happen here?" He apparently responded saying, "No I am not optimistic, because optimism doesn't help you. Because if you are optimistic, then you think that everything is going to work out eventually and then you don't do anything, and that's the problem." Then he said, "I'm also not pessimistic because pessimism is the same problem, because if you are a pessimist then you figure it's all going to go to hell anyway and there's not anything I can do about it and then you don't do anything, and that's the problem." Then he said, "What I am is hopeful. And hopefulness is doing the right thing even though you don't know that it's necessarily going to turn out well." If you have the right convergence of events and you're doing the right thing, then significant changes can take place. Of course, that

is exactly what happened in Czechoslovakia during his time as president. I have kept that in mind in my own work. I've been involved in sustainable agriculture issues now for 40 years and there have been a lot of times when there were reasons to be discouraged. So it's doing the right thing, even though you don't know that things are going to turn out well. I think this is the kind of concept of hopefulness that we should embrace. Wendell Berry referred to this as *difficult hope*. It's part of what inspires me.

As important as all of our work is, there is yet an even larger issue that provides the context for everything we're involved in—that is also important for us to acknowledge and embrace. And so I want to spend a little bit of time framing that issue and then talk more about the kind of things that are already happening that I think give us ground for hopefulness as we leave here.

Context and Science

We often forget the context because understandably we get so engaged in doing the things that are now, that need to be done. The work that you've all been doing, especially around pesticides, is such a great example of this, where we've got all of these important things to work on, whether it's the impacts on our children, the impacts on our food, and the impacts on all of us. And so, of course we get engaged in this and we have to do something to correct this. But I think as we do our important work to correct these problems, we must consider this larger context, that I call our *cultural meme*. The term *meme* was introduced by Richard

Dawkins with the sense that we have our own personal history and our personal experience that leads us to believe that certain kinds of things are the way they are. Within the scientific community, “seeing is believing” is a common statement. However, many of scientists are starting to recognize as a *cultural meme* that what we believe in determines what we see. So this is something that we have to come to terms with. One of my favorite scientists, Michael Pulanyi, a Hungarian scientist who spent a good bit of time in the United States after the conflict between Russia and Hungary, has written that you never can establish objectivity—that objectivity is not a reality. He determined that all of us operate from what he calls our tacit dimension, which comes out of who we are and what we believe, our personal history and experience. When we really want to know and exercise science, then we all have to operate outside of this tacit dimension and focus on what it is that we want to know. Then we get together around the same table and we share how we see things, and then we have to wrestle with that until we come to a consensus. It’s really the consensus that we come to that we then can call objectivity. Then somebody comes to the table with a different tacit dimension and brings an observation that none of us at the table had thought about. Suddenly, we’ve got to look at the whole thing again. So, science is not an accumulation of facts, it’s an ongoing process. That, to me, is what’s exciting about science.

When I think about my own farm, what I thought was sustainable 35 years ago is absolutely not sustainable today. If I were locked in ideologically, because I knew I had objective truth back then, the farm would not be successful today. So that’s the journey that we’re on. The *cultural meme* that we have created today is primarily determined, from my perspective, by our industrial economy. The industrial economy really emerged as a result from our discovery of fossil fuels. That was the innovation that drove the industry, first coal and oil, then natural gas. It was this cheap energy that made it possible for us to really re-conceptualize the world.

Possessors of Nature

It was also built on a prior notion coming out of the enlightenment when we began to see ourselves as somehow being separate from nature—that we only had not only a right, but a responsibility, as René Descartes put it, to become the masters and possessors of nature. We began to see ourselves as being somehow separate not a part of what Aldo Leopold referred to as the *land community* or the *biotic community*. Our responsibility was to dominate it. And, being that we saw ourselves as separate from nature, we somehow saw ourselves as being sort of isolated. Therefore, what we did and also our conscience was oriented to our fellow humans. We take care of or cared for them, to the extent that some of us want to do that for fellow humans, but that

doesn’t extend to the rest of the biotic community because the humans are somehow special. And then, partly coming out of the enlightenment and then going on into the industrial era, this whole notion emerged that in order to really understand the truth about things we have to reduce them to their simplest equation. When we reduce them to their simplest equation, then we understand what they are like. Then we assume that’s how the world works.

This led us to develop isolated disciplines. If you want to solve a problem, you have to understand it and address it in terms of the science within that discipline. There’s almost no communication between the disciplines, as problems become isolated problems and the answers to those problems get answered in terms of what that discipline is designed to look at. As a result of all of this simplification, we come to the conclusion that technology and science are the two things that are the most important things for us to learn. Arts and humanities become sort of fringe stuff, as science and technology determines how we should respond to and solve problems in the world. However, these are not objective truths, but a part of the *cultural meme* that determines how our basic culture operates.

Importantly, we also operate out of specific kind of economics and industrial economy. The industrial economy operates on the basis of maximum efficient production for short-term economic return. If you want to be successful, whether you’re a farmer or a manufacturer of computers or automobiles, that’s how you have to operate. There isn’t anything in this paradigm about resilience or sustainability. You have to simplify your management because that’s the way you gain more efficiency. And you go for economies of scale because that’s how you get maximum efficient production for short-



Fred Kirschenmann, PhD speaking at the 32nd National Pesticide Forum, Advancing Sustainable Communities, in Portland, OR.

term economic return. Huge crop monocultures are an example of the specialization. You're seeing technologies that are trying to solve problems more simply. Transgenic technologies are a perfect example of this. If you got Roundup Ready soybeans, instead of having to have very complex systems that you have to evolve in order to deal with your weed problems, you simply wait until the soybeans are up and then you spray Roundup (glyphosate) and kill all the weeds. The soybeans are going to grow and problem solved.

Then, of course, the reason that our farms get larger and larger and larger now is that it's about the economies of scale. Farmers have been told to get big or get out, farm fence row to fence row. And that's exactly what we've done. Of course a number of the unintended consequences from this economic paradigm is that when you have highly specialized and simplified and scaled up systems they become very brittle and not resilient—with cheap inputs (energy, fertilizer) and a philosophy of maximum efficient production for short-term economic return. We are now reaching a point where this approach and this system operating by this *cultural meme* is not going to work anymore in the future.

This is where you can either look at this as really bad news and therefore not hopeful, or you can look at it as the trigger that is going to bring about the opportunity for the kind of changes we're all talking about. It's that second approach that led Thomas Berry, another hero of mine, to refer to *moments of grace*—that we're not likely to bring about the changes to get the kind of resilience, purpose, and ethics that we think we ought to until it gets to a point where the current system doesn't work anymore. Then the kinds of changes that we need to see begin to take place. They're moments of grace.

As resources become depleted, food prices skyrocket, civil and economic crises emerge, and civil unrest follows. Michael Klare's

book, *The Race for What's Left*, tells the resource wars story, if we don't make the transition to a new future.

It is so important for us now to begin to relate to each other and to anticipate some of the changes coming at us. I always thought that my mission was to bring about change and to change people, but my thinking has transformed in the last six or seven years. I

read Jared Diamond's *Guns, Germs and Steel* and *Collapse*, in which he found that those civilizations that anticipated the changes coming at them, not the ones who were worrying about change, recognized the value of their ecological capital and their ecological resources and got a head start preparing for those changes and tended to thrive. Those civilizations that failed in that exercise were the ones that tended to collapse. That really re-focused how I think about things and how I think about the future. Ultimately, that makes me hopeful. When you anticipate the changes coming at you, then you can begin to look at the kinds of directions that we need to take. What are the kinds of relationships we need to develop? How do we get ready for that, recognizing the value of ecological resources? Ultimately, in our current *cultural*

meme. Our current economy is all about financial capital. It's about how much money you get and how much stuff you can accumulate. That's what determines your value. But, financial value has absolutely no value without ecological value, natural capital, and social capital. It's the social capital and ecological capital that is ultimately the basis for financial capital. These are all the kinds of things that we need to be working on or thinking about now as we think about the future.

Since this conference is primarily focused on pesticides, I want to put that into context. Despite the negative comments about USDA, most of which I share, there was an individual in the Agricultural Research Service, a pest management specialist, who wrote an essay together with several of his colleagues entitled *A Total Systems Approach to Sustainable Pest Management*. The piece, written by Joe Lewis and published in the *Proceedings of the National Academy of Sciences* back in 1997 was one of the most brilliant analyses



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of pesticide problems and how we need to deal with them. He said current methods, based on 50 years of experience now of trying to manage pests using what he called a *single tactic therapeutic intervention approach* (in other words, you have a pest problem you come in with a pesticide from outside and attack that pest to try and get rid of it), are absolutely not sustainable. The reason it's not sustainable is because you never get rid of all of the target pests, and you cause pest resistance—how many of us know about that now. You not only kill off organisms of the target pest, you also kill off other biological organisms, many of which previously served as predators in the system. So, you're actually creating a problem, worse than the one you're trying to solve.

He said we should not expect any different results from biotechnology than we got from chemical technology because it's still the same paradigm. It's still the *single tactic therapeutic intervention approach* to solving the problem. What we need to do, he said, is shift to what he called *natural systems management*. So how do we come to the point where we understand how natural systems function and then manage those natural systems in a way that prevent pests from emerging? And he finally boiled it down to a simple question which I've always loved. He said, what we ought to do, instead of asking how do I get rid of the pest, is ask why is the pest a pest. And I thought what a brilliant analysis. Why is the pest a pest? What are we doing to cause pests to emerge? Now we need to use this perspective in the context of a new *cultural meme* that we all need to develop and share.

The *single tactic therapeutic intervention approach* does not have the kind of diversity that is a part of a natural systems management. We know now that the fossil fuel system that drives not only our farming systems but our current economy will only last a very short period of time. We know that many of the inputs we're using are also on a very short period of time. We know that our fresh water systems are being depleted, so that's on a very short period of time. And then, of course, you add to that the whole issue of climate change and the impact with that over a very short period of time.

Historical Context

I want you to imagine a timeline of human history all the way across the room. An anthropologist, Ernest Schusky, wrote a book called *Culture and Agriculture* in 1989 and asked how have we fed ourselves as humans ever since we've been on the planet? Now imagine this timeline. For the first 190,000 years that we've been on the planet we've fed ourselves as hunter-gatherers. We were nonfood producers, but we were food collectors. Like other species, we tended to live in relatively small tribal societies. We would harvest out a place and then we would move on to another place. The author said from the point of view of energy efficiency this was the most efficient food system we ever had. He calculated that we were getting about 20 kilo calories of food energy for every one kilo calorie of energy that we invested to make that food available. It has been pointed out by Riane Eisler in her book *The Chalice and the Blade* that, because we were hunter-gatherers, we

had to work together and cooperate together, so it was more the chalice than the blade which was the metaphor for our culture back then. We were not dominators.

It wasn't until we started to go into the second phase, three-quarters of the way down the timeline to the Neolithic revolution, when we start to practice agriculture. This was ten to eleven thousand years ago. And now you've got a space on the timeline that's about three inches long for this 10,000 year period, and here now we start to produce food and domesticate animals and plants. This is, Ernest Schusky says, a very land-intensive kind of agriculture. This is why I disagree a little bit about whether or not it was organic. Basically, it was a slash and burn kind of agriculture, because you could go out there and you could cut down the grass and trees and burn them. Then you get the fertility from the ash and the natural fertility of the soil, resulting in pretty good yields from that for a year or two. Now we were only getting about 10 kilo calories of food for every kilo calorie of energy we invested in making that food available, but still pretty efficient. Then, he says, around the beginning of the 20th century we entered into a third era of producing our food, which he calls the "Neocaloric Era," because it's entirely based on old calories. Then he makes an important observation. He said this era now will probably be 150 to 200 years at most. Now remember the first producing oil well in this country was in Titusville Pennsylvania in 1859 and that was about 150 years ago. So what do we have, another 20 or 50 years? It's anybody's guess. But what we do know is that we're using up the old calories and they're not going to be there for us in the future. We cannot simply concentrate on dealing with our current problems and pesticides, important as all these are. If that's all we do and then we don't anticipate the changes coming at us and get a head start preparing for those changes. We should recognize the importance of our ecological capitol, or we're not going to be very happy about the future that we are going to embrace or become a part of. And that is what we have to add to our plate and our agenda as we think about the future.

We're really talking about redesigning the food system, not just greening it up. Think about this transformation moving into the future under a different kind of *cultural meme*. When the industrial kind of approach was first developed, botanist and organic farming pioneer Sir Albert Howard called it the NPK [nitrogen, phosphorous, potassium] mentality and already understood that it was not a direction we should be going in because, as he said, it is a form of banditry. It was a form of banditry because we were going to ignore restoring the biological health of our soil by using all these NPK synthetic inputs as a substitute for soil, and our future generations would be robbed of the healthy soil which they're going to need.

Liberty Hyde Bailey, one of the first deans of a college of agriculture, botanist, and author of *The Holy Earth*, understood the gifts, of nature and tried to cultivate a different kind of culture. Like Sir Albert Howard, who said we have to farm in nature's image, Liberty Hyde Bailey said we must have almost a spiritual approach and relationship to nature.

What We Have to Do Now

Then, of course, Aldo Leopold said one of the most important statements on ecological conscience: "A land ethic, then, reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health of the land. Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity."

This is what we have to do now. It's not enough any longer for us simply to care about our fellow humans. We have to care for all of the life in the biotic community of which, as Aldo Leopold said, we are simply plain members and citizens. We are not the dominators. We are not the culture. We are not the conquerors of the biotic community. So, we have to find our place in that, because if it is not all healthy and if it doesn't all have the capacity for self-renewal, then none of it will include us.

This is the new consciousness that we have to develop. Leopold recognized that this was not going to happen simply because he wrote about it. It also wasn't going to happen with the free market because there are too many components of the biotic community that have no immediate economic return. It's also not going to happen through regulation, because you can't put in place that kind of control system, where you control everything, so that it operates correctly. That's why we have to develop an ecological conscience. He realized that was a huge challenge, that religion and philosophy were not going to help as much because they hadn't even heard of it yet. He understood there wasn't much that he could do as an individual to make this happen. He finally concluded that this had to become part of a social evolution. And, that's actually what's happening to us right now.

Let me give you a few examples of this social evolution that's taking place now and the direct hopefulness associated with it. The *Soil Health and Sustainability* program, spearheaded by Ray Archuleta at USDA's Natural Resources Conservation Service, is working with farmers, both organic and conventional. Even if you're a monoculture corn soybean farmer, with the right mixture of cover crops mixed in with your corn-soybean rotation over a period of six to seven years, you can reduce your fertilizer and pesticide input by 70%. You can do this and still maintain the same yields and the biological health of your soil improves to such an extent that, instead of having soil absorbing only a half inch of rain water an hour, it begins to absorb eight inches of rain water an hour.

This means that during heavy rains there is less flooding because the water actually goes into the soil and some of it back into the aquifers, essential to protecting fresh water resources. During drought periods, we have more moisture stored in the soil. Then, with your cover

crops, you also have more biological activity and green manure, which provides a lot of benefits. This is a transformation that started to take place only about a year and half ago.

Secondly, we are beginning to recognize the importance of biodiversity. Matt Liebman, who is a weed ecologist at Iowa State University, has done 10 years of research now on a simple kind of project that dramatically reduces pesticides with a three or four crop rotation, instead of a two crop rotation. His research at the Marsdon Research Farm has one plot of corn-soybean rotation, the two crop rotation, with all those synthetic inputs like any conventional farmer would do today. His second plot is a corn-and-soybean rotation with small grain and red clover, a three crop rotation, and a modest amount of livestock manure. A third plot, where he has corn and soybeans and small grain and alfalfa is a four crop rotation. He's demonstrated that with the two crop and four crop rotation, the simple change of adding livestock manure can reduce pesticide and fertilizer input by almost 90%. The return to land and labor is actually slightly higher with the four crop rotation.

The evidence is there for what we can do. I've actually asked farmers in Iowa this question: so you got all these benefits, why wouldn't you do this? And what are they going to tell you is: Hey, you know, I can't take the alfalfa to a local elevator and sell it. Of course, what they're pointing out is that they feel caught inside of a market system and a market infrastructure that pays them and demands them to raise more corn and soybeans. With alfalfa, if you have drought years, you can get a pretty good price and, if you don't, you may not even be able to sell it. That drives the motivation of the farmers.

One of the reasons why that story is so important to me is that it's often so easy for us to simply say, well, the farmers are doing all these wrong things and they should change, or we have to get them to change. We have to recognize that we all have to change, and we have to change the market system. If we don't diversify the market system, then farmers are not very likely to diversify their farming system. We all have to become engaged in the process.

A third piece of good news is what we're discovering now is the benefits of perennialization. We're doing some prairie strip research now through the Leopold Center (Iowa State University) where we're putting strips of perennial prairie into critical places within a typical soybean rotation. The kind of benefits that you get from that in terms of soil preservation, in terms of absorbing more moisture, and all of that is quite dramatic. But we also now have people like Ivette Perfecto with the University of Michigan, who, together with her colleagues, has written this book, *Natures Matrix*, describing their work primarily with farmers in the global south who have taken land where forests have been destroyed and now reincorporating tree crops for food crops. The benefits of that are enormous, both in terms of restoring the biological health of soil and maintaining moisture, and less irrigation. Then there is Wes Jackson at

the Land Institute (Salina, Kansas), who has 30 years of research in perennial cropping systems. When Wes first did this, biologists said you're crazy because plants are either going to invest in the root system or they're going to invest in seeds. So, if you're going to invest in roots, you're never going to get the yields. Well, Wes thought the biology was more complex than this and he kept with the research. What he's demonstrated now is that you, in fact, can have yields almost comparable to annuals, with root systems that go eight feet into the ground instead of 18 inches in annuals.

You wouldn't expect John Deere to be big on the types of things I've been talking about because they're a part of the conventional system. However, the February 2013 issue of its magazine, *The Furrow*, was devoted to soil health, with stories about farmers using cover crops and other systems designed for soil health. And the next issue entitled, *A Matter of Taste*, is all about the type of quality that chefs and other people in our food system now want. Of course, there's a whole

school of new chefs that call themselves the farm-to-table chefs who find farmers using methods to restore the biological health of their soil, which, in turn, produces the kind of food products that enable them to simply prepare it in a way that allows the flavors to express themselves.

Another thing that I think is important here is the role of the arts in all of this. We think we have to convince people to do things and it's the arts really that can help us to imagine a better world. I want to read to you a very brief piece written by Kathleen Dean Moore, who most of you know because she's the head of the Philosophy Department here at Portland State University. In her book, *The Pine Island Paradox*, she writes about the environmental damage that we're causing and then imagines her granddaughter writing her a letter from 100 years in the future. This is what she wrote and what she imagines her granddaughter would be saying:

How could you not have known? What more evidence did you need that your lives, your comfortable lives, would do so much damage to ours? Did you think you could wage war against na-

tions without waging war against people and against the earth? Didn't you wonder what we would drink once you had poisoned the aquifers? Didn't you wonder what we would breathe once you had poisoned the air? Did you stop to ask how we would be safe in a world poisoned by war? Did you think that it all belonged to you, this beautiful earth? You, who loved your children, did you think we could live without clean air and healthy cities? You, who loved the earth, did you think we could live without bird songs and swaying trees? And if you knew, how could you not care? What could matter more to you than your children and their babies? How could a parent destroy what is life-giving and astonishing in her child's world? And if you knew and if you

cared, how could you not act? What excuses did you make? And now, what would you have us do?

Now, when we think about where we are in relationship to this kind of imaginative letter that one of our grandchildren might write to us in the future, that can have at least the possibility of encouraging even more action than any

of us are already doing. We need to create a new *cultural meme* that will provide us with the context for the kind of action that we need to take and how we need to relate to all of those other living beings and those other plain members and citizens together with us in that biotic community. Our approach has to become self-renewing, if we're going to have a productive and positive future, given the new challenges that we are all going to be facing with the end of cheap technology, the depletion of fresh water, the elimination of all the other inputs we've been using, and the challenges with climate change.

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